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**From:** Cunningham, Denise  
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**Subject:** FW: NCER's Research Dialogue, Week of Nov. 27

*NCER's  
research  
dialogue*



[This Week in NCER](#)

[Weekly Events Forecast](#)  
[Highlighted Publications](#)

[In the News](#)

[Spotlight](#)

[NCER's Research Dialogue Archive](#)

**December 1, 2017**  
**This week in NCER:**

#### **SHC**

- **SBIR:** The EPA SBIR Team participated in the EPA Air Sensor Brownbag, which serves as a monthly informal meeting for experts and users of air sensor technology from all areas of the EPA including regional offices, the Office of Research and Development, and the Office of Air and Radiation. The virtual meeting consisted of an EPA SBIR Program Overview presented by Team Lead, April Richards, as well as Presentations from small businesses iSense, SPEC Sensors, Giner, and Vaporsens on their SBIR Phase I projects on formaldehyde sensors. The Brownbag functioned as an opportunity to educate EPA employees about numerous air sensor projects, while also allowing the companies to get feedback on their technology from others in their field.
- **P3:** A 2012 P3 Phase II team from Appalachian State University recently completed their project entitled "[An On-Site Biological Graywater Treatment System Suitable for a Small Business](#)," which aims to test and implement a plant-based filter for wastewater remediation and reuse. Due to the interdisciplinary and community-based approach used in this research, the project was awarded both the Annual Sustainability Research Forum Award from the Appalachian State University Office of Sustainability, and the Hubbard Programs for Faculty Excellence in 2014, in addition to winning the 2016 Boone Discovery Forum Competition. In March the team published a paper in the scientific journal Solutions, which can be read [here](#).

SSWR

- **Programmatic Review Meeting:** NCER held the programmatic review meeting for the National Priorities Transdisciplinary Research into Drinking and Controlling Lead in Drinking Water RFA on Nov. 21, 2017. This RFA supports the Agency's priorities to provide clean and safe drinking water and specifically looks at the effect of lead on public health. EPA issued this call for research to foster projects to (1) identify communities that are at a high risk of experiencing the adverse health effects of lead in drinking water; (2) identify opportunities to mitigate these risks; and (3) conduct educational and outreach efforts so that water system managers and the general public are aware of these risks and opportunities.

## Fellowships

- **CASE Federal Funding Task Force:** NCER hosted a webinar on Nov. 21 for Fellows from the National Science Foundation (NSF) who are prospective applicants for the Graduate Research Internship Program (GRIP). The NSF GRIP recently opened the application module for current recipients of the NSF Graduate Research Fellowship. The deadline for applications is Dec. 15. This program is funded by NSF. EPA provides in-kind (non-financial) support through provision of mentoring, work space, and collaborative research opportunities. In anticipation of the open application cycle, Fellowship Team Leader Jayne Michaud coordinated across ORD NERL, NHEERL and NRMRL to collect and update internships opportunities. At present, ORD has 39 [GRIP opportunities](#) that span ORD's diverse research portfolio. Participating agencies hold outreach webinars to connect students with internship opportunities. To submit a GRIP opportunity, please contact [michaud.jayne@epa.gov](mailto:michaud.jayne@epa.gov).



- [EPA's Water Reuse, Water Scarcity, and Drought Grants Progress Review Meeting & Webinar \(Dec. 7-8\)](#)

## Mandatory Trainings



Don't forget to check out the [EPA Science Matters Newsletter](#)!

- [EPA Researchers are Helping Cities Measure Their Resilience](#) – EPA researchers looked at vulnerabilities to environmental changes in Washington, D.C., and Worcester, Massachusetts.



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SHC

• **Grantee Publication:** Approximately 23% of mothers of children with autism spectrum disorder (ASD) produce specific patterns of autoantibodies to fetal brain proteins that have been detected in only 1% of mothers of typically developing children. Mothers of children with ASD are also disproportionately affected by metabolic conditions during pregnancy. As both metabolic and immune function are controlled by a common signaling pathway, disruption in one system may lead to dysfunction in the other. Researchers from the [NIEHS/EPA Children's Center](#) at the University of California, Davis [investigated](#) whether ASD-specific maternal autoantibodies were associated with metabolic conditions, including diabetes, hypertension, and obesity. Participants in the study were mothers of 2-5 year old children with ASD. Prevalence of anti-fetal brain autoantibodies was higher among mothers with diabetes, hypertension, or overweight compared to healthy mothers. Among mothers whose children exhibited severe ASD, those diagnosed with type 2 or gestational diabetes were 2.7-fold more likely to produce anti-fetal brain autoantibodies. These results suggest that some mothers of children with ASD and pregnancies complicated by metabolic conditions may be more susceptible to producing anti-fetal brain autoantibodies.

#### ACE

• **Grantee Publication:** Fine particulate matter (PM with aerodynamic diameter  $\leq 2.5$   $\mu\text{m}$ , or PM<sub>2.5</sub>) has been associated with negative respiratory and cardiovascular outcomes. Oxidative potential (OP) has been proposed as a measure of PM<sub>2.5</sub> toxicity. It is a measure of particles' ability to generate reactive oxygen species and thus cause oxidative stress, which has been suggested as an underlying driver of adverse outcomes associated with PM<sub>2.5</sub>. Although there are several lines of evidence linking OP to adverse health outcomes, evidence of population-level impact of measured daily ambient OP has been lacking. To assess the population-level health outcomes for exposure to ambient OP, the [Emory/Georgia Tech Clean Air Research Center](#) applied time-series analysis to estimate associations between daily measured ambient OP and cardiorespiratory emergency department (ED) visits. Daily average OP<sup>DTT</sup> (OP measured using dithiothreitol assay) in water-soluble fine PM at a central monitor site in Atlanta, Georgia were measured over eight sampling periods during June 2012–April 2013; and data on ED visits for selected cardiorespiratory outcomes for the five-county Atlanta metropolitan area were used. Time-series analysis using Poisson log-linear regression models were conducted. Lag 0-2 OP<sup>DTT</sup> (3-day moving average of OP<sup>DTT</sup> on the same day as the ED visit, 1-day previous, and 2-day previous) was used as exposure of interest because prior studies indicated associations of health outcomes and multiday elevated pollutant levels. As reported in the [new study](#) published in

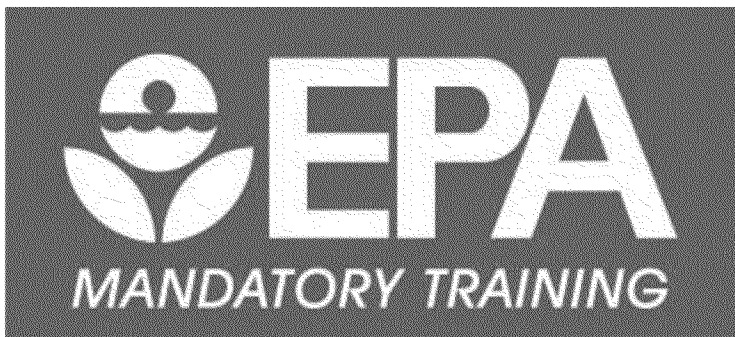
*Environmental Health and Perspectives*, lag 0–2 OP<sup>DTT</sup> was associated with ED visits for multiple cardiorespiratory outcomes. These results support the utility of OP<sup>DTT</sup> as a measure of fine particle toxicity.


CSS

• **Grantee Publication:** Bill Murphy and Jamie Thomson, co-PIs of the HMAPs (Human Tissue Models for Analysis of Pathways) STAR Center at the University of Wisconsin, published a paper with Christopher Barry titled “Uniform neural tissue models produced on synthetic hydrogels using standard culture techniques,” regarding sample reproducibility for model neural tissues formed on synthetic hydrogels. Pluripotent stem (PS) cells have been characterized by an inherent ability to self-organize into 3D “organoids” resembling stomach, intestine, liver, kidney, and brain tissues, offering a potentially powerful tool for modeling human development and disease. However, organoid formation must be quantitatively reproducible for toxicity screening applications. The value of 3D cellular models continues to expand as new strategies for inducing specialization evolve. In the article they report on a successful strategy to produce uniform neural tissue constructs with reproducible global gene expression profiles for replicate samples from multiple experiments.

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